Resource Action: FRH-1 **Task Force Recommendation Category:** 2

IMPLEMENT A COMPREHENSIVE MARKING/TAGGING PROGRAM AT THE FEATHER RIVER HATCHERY

Related PM&Es:

- This resource action is intended to address marking/tagging related actions proposed by FRH-2, FRH-8, and FRH-9.
- FRH-18, development of adaptive management plan for operations of the Feather River Hatchery.

1. PM&E Description:

Develop and implement an appropriate marking/tagging program for all anadromous fish produced and released by the Feather River Hatchery. Tagging programs are essential to evaluating the effectiveness and impacts of hatchery operations. The FRH tagging program would rely on coded wire tags, otolith thermal marks, fin clips, and/or passive integrated tags. The specific attributes of the tagging program will be guided by: (1) the constant fractional marking program currently being developed by CDFG (via CALFED contractors), (2) FRH objectives and issues identified through the FRH adaptive management program (FRH-18), (3) the need to provide statistically reliable estimates of FRH contribution to ocean/inland fisheries, out-of-basin straying, and spawning populations, (4) the need to provide visual identification of hatchery origin steelhead and spring-run Chinook, and (5) the need to provide statistically reliable estimates of proportions of wild, natural origin salmon and steelhead.

2. Project Nexus

Under the FERC license the FRH will continue to be a mitigation feature of the State Water Project's Oroville Facilities Under the FERC agreement and through the ESA consultation process, the Department may be required to better understand the impacts of hatchery (and project) on natural salmonid populations. Without the ability to distinguish hatchery fish from naturally spawning fish in the ocean and inland fisheries and on the spawning grounds with an acceptable degree of statistical reliability, it may not be possible to assess hatchery (or project) impacts on natural salmonid populations.

3. Potential Environmental Benefits

The ability to distinguish hatchery from naturally spawning fish will allow biologists and managers to better identify hatchery impacts and modify operations to minimize adverse effects. A marking program is thus a critical part of the adaptive process the Department and other resource agencies would need to integrate hatchery operations into an overall Central Valley salmon recovery and conservation program.

These reports are for discussion purposes only, and do not denote support by the EWG Collaborative.

4. Potential Constraints

The major constraints are institutional and financial. Implementing this program would require critical review of potential tagging program attributes. Different approaches to tagging should be considered through an adaptive process including DWR staff and members of an interagency advisory team. The tagging program should be evaluated and recommendations made to modify the marking program as needed to meet data needs. An appropriate program for tag recovery and analysis of resulting data would also be required. Staff for analysis and management of a tagging program will be covered by FRH-18. The necessary recovery programs would be funded separately.

5. Existing Conditions

For about the past 10 years, a variable fraction of FRH salmon was coded wire tagged and adipose clipped, with the fraction generally 10 percent or less. Beginning with the 2001 cohort, all spring Chinook are being tagged and all steelhead are being adipose fin clipped (but not tagged). Prior to 1994 few FRH salmon were tagged.

6. Design Considerations

Other than determination and design of the sampling program itself, implementing this proposed action would require some physical design considerations at the FRH. First, one must consider how the tagging operations are to be situated on the hatchery grounds. The existing tagging trailer would have to be evaluated to determine if it can meet the tagging needs of new program – both in terms of the numbers of fish to be tagged and the timing of the releases needed to meet experimental and operational goals. Plumbing, electrical and fish holding needs must be considered in this evaluation. Hatchery raceways would need modifications to have sufficient flexibility to segregate groups of tagged fish. Also, a more permanent tag sample storage facility should be considered. An alternate strategy would be to establish an affiliate tag processing lab at the FRH where samples from the Feather and perhaps Yuba Rivers could be stored, the tags extracted and the tags decoded.

7. Synergism and Conflicts

This action is synergistic with all actions designed to make operation of the FRH more environmentally sensitive, while still meeting DWR's mitigation responsibilities for construction and operation of the Oroville complex. There are no apparent conflicts with other proposed resource actions or existing hatchery operations.

8. Uncertainties

Given the adaptive nature of the proposed program the final product of this effort is unknown.

9. Cost Estimate

Environmental Scientist staff time would be required to perform the necessary review, data analysis, report writing and coordination. We expect that this staff time would amount to approximately $60,000 annually (this estimate does not include time of existing DFG hatchery staff). Costs of the tagging program itself are difficult to estimate given the proposed adaptive development of the tagging program. However, if coded wire tag constant fractional marking program were to be implemented we could expect tagging costs to be approximately $800,000 per year. This assumes tagging about 5 million smolts at a cost of 16 cents per tag (tag purchase plus application) and assumes that the existing tagging trailer and contracting process are adequate. Additional equipment (e.g. tag injectors) required to place the tags can be expected to cost an additional $50,0000 per year.

10. Recommendations

Development of marking/tagging program that meets program objectives is essential to future operation and management of the Feather River Hatchery.

Resource Action: FRH-18	Task Force Recommendation Category: 1

IMPLEMENT A COMPREHENSIVE ADAPTIVE MANAGEMENT PROGRAM FOR FEATHER RIVER HATCHERY

Related PM&Es:

- This is an omnibus resource action intended to address numerous concerns about operations and practices of the FRH. It addresses issues identified in resource actions: FRH-3, FRH-12, FRH-13, FRH-14, FRH-15, FRH-16, FRH-17, EWG-40 and EWG-42.
- FRH-1 is related, but is specific to development of a tagging program.

1. PM&E Description:

The goal of this program is to provide framework for ongoing evaluation and improvements in operations of the Feather River Hatchery (FRH). This resource action would create a program to adaptively manage Feather River hatchery practices to enhance benefits while assessing and minimizing negative impacts The review and revision of FRH practices would include assessment of: 1) production goals, 2) release strategies (including timing, size at release and release location), 3) straying impacts, 4) genetic integrity of FR stocks, 5) marking program effectiveness, 6) interactions with wild fishes, 7) diseases within and propagated by FRH, and 8) rearing practices, including potential implementation of NATURES type program. An adaptive approach to addressing these issues is necessary because goals of the FRH are likely to change, and because of uncertainty regarding necessary changes in hatchery operations. A long-term, adaptive approach is also sensible given that it will take several generations (with at typical 3-4 year age at maturity) to observe effectiveness of management actions. DWR would provide necessary staff to evaluate these issues, implement necessary changes, and coordinate findings/decisions with a FRH advisory committee. Specific tasks, studies and changes in hatchery practices would be developed through products of SP-F9 reports and early meetings with the FRH advisory committee.

2. Project Nexus

Under the FERC license the FRH will continue to be a mitigation feature of the State Water Project's Oroville unit, albeit likely with some significant operational changes. Under the FERC agreement and through the ESA consultation process, the Department will be required to better understand mitigation success and the impacts of hatchery (and project) on naturally salmonid populations. In terms of numbers of fish, the hatchery has done an admirable job of mitigating the habitat losses – especially with fall Chinook. However the hatchery has had some undesirable impacts including negative interactions with wild salmonids, obscuring the genetic and phenotypic differences between fall and spring Chinook, released practices have increased straying of Feather River Chinook to

the other Central Valley streams resulting in genetic introgression with other Central Valley stocks.

3. Potential Environmental Benefits

Ongoing evaluation of the effects and benefits of hatchery operations should result in a more environmentally friendly mitigation hatchery and salmonid populations that have increased overall fitness. As part of a broader Central Valley salmonid restoration/science program, the evaluation program is essential to recovery to listed salmonid runs.

4. Potential Constraints

The potential constraints are institutional and financial, but also include coordination with other similar efforts through the Central Valley. Funding needs may include creating new environmental scientist positions (1 to 3) to carry out the hatchery evaluation program. This will increase overall costs of the SWP operations. Hiring new staff may be difficult given current state budget crisis related hiring restrictions. Integration within Valley-wide hatchery/salmon science system will also be a challenge. To be most effective, the FRH program should be an integral part of a Valley-wide system. This management system includes coordination with other Central Valley hatcheries and integration with salmon inland/ocean salmon marking and monitoring programs.

5. Existing Conditions

With the exception of the current FERC related process, there is no concerted on-going effort on part of DWR or DFG to evaluate the effect of the Feather River Hatchery. This effort is needed to help protect salmon and steelhead resources and to prepare for subsequent FERC licenses and compliance with state and federal endangered species acts.

6. Design Considerations

No physical design considerations are associated with this resource action.

7. Synergism and Conflicts

This action is synergistic with all actions designed to make operation of the FRH more environmentally sensitive, while still meeting DWR's mitigation responsibilities for construction and operation of the Oroville complex. There are no apparent conflicts with other proposed resource actions or existing hatchery operations.

8. Uncertainties

There is little uncertainty about the necessity of this program. However, given the adaptive nature of the proposed program the final products of this effort are unclear.

9. Cost Estimate

Additional environmental scientist staff time will be required to perform the hatchery evaluation proposed in this resource action. We expect this effort would require two environmental scientist positions at an approximate annual cost of $150,000. Some additional costs not included in this estimate may be required for office equipment, travel and training.

10. Recommendations

Development of an adaptive hatchery evaluation program is essential to successful management of the Feather River Hatchery. This program should be given a very high priority.